Олимпиада СПбГУ по информатике 2021/22 учебного года

A	B	C	D	E	F	Sum
100	100	100	100	58	0	458

Task A ()

```
#define _CRT_SECURE_NO_WARNINGS
#define _USE_MATH_CONSTANTS
#include <bits/stdc++.h>
#define forall(i, x) for(auto& i: x)
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()

using namespace std;
using ll = long long;
using ull = unsigned long long;
using ld = long double;

void solve() {
    int n;
    cin >> n;
    map<ll, ll> a;
    for(int i = 0; i < n; i++) {
        int x, y;
        cin >> x >> y;
        while(x%10==0){
            x/=10;y++;
        }
        a[y] += x;
    }
    while(a.size() > 1){
        pair<ll, ll> cur = *a.begin();
        if(cur.second%10){
            break;
        }
        else{
            a.erase(a.begin());
            while(cur.second%10==0){
                cur.second/=10;
                cur.first++;
            }
            a[cur.first] += cur.second;
        }
    }
    pair<ll, ll> cur = *a.begin();
    a.erase(a.begin());
    while(cur.second%10==0){
        cur.second/=10;
        cur.first++;
    }
    a[cur.first] += cur.second;
    cout << a.begin()->first;
}


signed main() {
    cin.tie(0)->ios::sync_with_stdio(0);
    cout << setprecision(15) << fixed;
    int tt = 1;
    //cin >> tt;
    while (tt--) solve();
    return 0;
```

}

Task B ()

```cpp
#define _CRT_SECURE_NO_WARNINGS
#define _USE_MATH_CONSTANTS
#include <bits/stdc++.h>
#define forall(i, x) for(auto& i: x)
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()

using namespace std;
using ll = long long;
using ull = unsigned long long;
using ld = long double;

void solve() {
    int n;
    cin >> n;
    vector<int> v(n);
    forall(i, v) cin >> i;
    stack<int> ind;
    for(int i = 0; i < n; i++) if(v[i]) ind.push(i);

    while(!ind.empty()) {
        while(v[ind.top()]) {
            cout << "Flip and wait" << endl;
            int cur = 0;
            while (cur <= ind.top()) {
                string s;
                cin >> s;
                int cnt = 0;
                forall(i, s) if (i == 'e') cnt++;
                cnt /= 2;
                cur += cnt;
                if (cur <= ind.top()) cout << "Wait" << endl;
                else break;
            }
            v[ind.top()]--;
        }
        ind.pop();
    }
    cout << "Stop" << endl;
}


signed main() {
    cin.tie(0)->ios::sync_with_stdio(0);
    cout << setprecision(15) << fixed;
    int tt = 1;
    //cin >> tt;
    while (tt--) solve();
    return 0;
}
//test sys - good luck
```

Task C ()

```cpp
#define _CRT_SECURE_NO_WARNINGS
#define _USE_MATH_CONSTANTS
#include <bits/stdc++.h>
#define forall(i, x) for(auto& i: x)
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()

using namespace std;
using ll = long long;
using ull = unsigned long long;
using ld = long double;

map<string, string> m1 = {{"00", "?0"}, {"10", "1?"}, {"11", "?1"}, {"01", "0?"}};
map<string, string> m2 = {{"?0", "00"}, {"1?", "10"}, {"?1", "11"}, {"0?", "01"}};

void solve() {
    string s;
    cin >> s;
    int n = s.size();
    bool f = 0;
    forall(i, s) if(i == '?') f = 1;
    if(!f) {
        for(int i = 0; i < n; i += 2){
            string t = s.substr(i, 2);
            if(t.size() == 2) cout << m1[t];
            else cout << s[i];
        }
        cout << endl;
    }
    else{
        for(int i = 0; i < n; i += 2){
            string t = s.substr(i, 2);
            if(t.size() == 2) cout << m2[t];
            else cout << s[i];
        }
        cout << endl;
    }
}


signed main() {
    cin.tie(0)->ios::sync_with_stdio(0);
    cout << setprecision(15) << fixed;
    int tt = 1;
    cin >> tt;
    while (tt--) solve();
    return 0;
}
```

Task D ()

```
#define _CRT_SECURE_NO_WARNINGS
#define _USE_MATH_CONSTANTS
#include <bits/stdc++.h>
#define forall(i, x) for(auto& i: x)
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()

using namespace std;
using ll = long long;
using ull = unsigned long long;
using ld = long double;

const ll mod = 998244353;

void solve() {
    ll n;
    cin >> n;
    n++;
    ll ans2 = n / mod + n / (mod * mod);
    ll x = 1;
    if(n%mod == 0){
        cout << ans2 << ' ' << (n/mod&1?mod-1:1);
        return;
    }
        ll add = (n/mod&1);
        if(add == 0) add = 1;
        else add = mod - 1;
        n %= mod;
    if(n > (mod-1>>1)){
        for(ll i = 2; i <= mod-1-n; i++){
            x *= i;
            x%=mod;
        }
        for(ll i = mod - n; i <= (mod-1>>1); i++){
            x *= (-i*i) % mod;
            x%=mod;
        }
        if(x < 0) x += mod;
        cout << ans2 << ' ' << add * x % mod;
    }
    else{
        for(ll i = 2; i <= n; i++){
            x *= i;
            x%=mod;
        }
        cout << ans2 << ' ' << add * x % mod;
    }
}


signed main() {
    cin.tie(0)->ios::sync_with_stdio(0);
    cout << setprecision(15) << fixed;
    int tt = 1;
    //cin >> tt;
    while (tt--) solve();
    return 0;
}
```

Task E ()

```
#define _CRT_SECURE_NO_WARNINGS
#define _USE_MATH_CONSTANTS
#include <bits/stdc++.h>
#define forall(i, x) for(auto& i: x)
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()

using namespace std;
using ll = long long;
using ull = unsigned long long;
using ld = long double;

void solve() {
    int n;
    cin >> n;
    vector<int> v(n);
    forall(i, v) cin >> i;
    int q;
    cin >> q;
    while(q--){
        int a, b, d;
        cin >> a >> b >> d;
        ll ans = 0;
        for(int i = a; i < b; i++) ans += (d + v[i] - 1) / v[i];
        cout << ans << '\n';
    }
}


signed main() {
    cin.tie(0)->ios::sync_with_stdio(0);
    cout << setprecision(15) << fixed;
    int tt = 1;
    //cin >> tt;
    while (tt--) solve();
    return 0;
}
```

Task F ()

```
#define _CRT_SECURE_NO_WARNINGS
#define _USE_MATH_CONSTANTS
#include <bits/stdc++.h>
#define forall(i, x) for(auto& i: x)
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()

using namespace std;
using ll = long long;
using ull = unsigned long long;
using ld = long double;

mt19937 rnd(chrono::high_resolution_clock::now().time_since_epoch().count());

void solve() {
    int n;
    cin >> n;
    vector<pair<int, int>> v(n);
    forall(i, v){
        cin >> i.first >> i.second;
    }
    vector<int> cur(n+1, 0);
    int mx = 0;
    while(clock()/(double)CLOCKS_PER_SEC <= 1.9){
        map<int, int> m;
        m[0] = 1;
        for(int i = 1; i <= n; i++){
            m[cur[i] = cur[i-1] + (rnd() % (v[i-1].second - v[i-1].first + 1) + v[i-1].first)]++;
        }
        int cnt = 0;
        forall(i, m) cnt = max(cnt, i.second);
        mx = max(mx, cnt);
    }
    cout << mx;
}


signed main() {
    cin.tie(0)->ios::sync_with_stdio(0);
    cout << setprecision(15) << fixed;
    int tt = 1;
    //cin >> tt;
    while (tt--) solve();
    return 0;
}//agv9
```