Олимпиада СПбГУ по информатике 2021/22 учебного года

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

Task A ()

```cpp
#include <iostream>
#include <vector>
#include <string>
#include <cmath>
#include <algorithm>
#include <map>
#include <set>
#include <random>
#include <queue>

#define X first
#define Y second
#define mp make_pair
#define rev(i, n) for (int i = 0; i < n; ++i)
#define forn(n) for (int i = 0; i < n; ++i)
#define rrev(i, n) for (int i = n; i >= 0; ++i)

using namespace std;

typedef long long ll;
typedef long double ld;

int main() {
        ios_base::sync_with_stdio(0);
        cin.tie(0);
        ll n, a, b; cin >> n;
        map<ll, int> m;
        forn(n) {
                cin >> a >> b;
                while (a > 0) {
                        m[b] += a % 10, a /= 10;
                        if (m[b] > 10) m[b + 1] += m[b] / 10, m[b] %= 10;
                        b++;
                }
        }
        for (auto e : m) {
                if (e.Y > 9) m[e.X + 1] += e.Y / 10, m[e.X] %= 10;
        }
        ll mi = 1e18;
        for (auto e : m) {
                if (e.Y == 0) continue;
                mi = min(mi, e.X);
        }
        cout << mi << endl;
        return 0;
}
```

Task B ()

```cpp
#include <iostream>
#include <vector>
#include <string>
#include <cmath>
#include <algorithm>
#include <map>
#include <set>
#include <random>
#include <queue>

#define X first
#define Y second
#define mp make_pair
#define rev(i, n) for (int i = 0; i < n; ++i)
#define forn(n) for (int i = 0; i < n; ++i)
#define rrev(i, n) for (int i = n; i >= 0; ++i)

using namespace std;

typedef long long ll;
typedef long double ld;

int main() {
        ios_base::sync_with_stdio(0);
        cin.tie(0);
        vector<string> answers = { "Wait", "Flip_and_wait", "Stop" };
        int n, idx = 0; cin >> n;
        vector<int> k(n);
        forn(n) {
                cin >> k[i];
                if (k[i] > 0) idx = i;
        }
        while (idx >= 0) {
                if (k[idx] > 0) cout << answers[1] << endl;
                int cnt = 0, q;
                while (k[idx] > 0) {
                        string s; cin >> s;
                        if (s == "Fail" || s == "Tired" || s == "Burn") {
                                return 0;
                        }
                        q = 0;
                        forn(s.size()) q += (s[i] == 'e');
                        cnt += q / 2;
                        if (cnt > idx && k[idx] == 1) {
                                k[idx]--;
                                break;
                        }
                        if (cnt > idx) {
                                cout << answers[1] << endl;
                                k[idx]--;
                                cnt = 0;
                        }
                        else{
                                cout << answers[0] << endl;
                        }
                }
                idx--;
        }
        cout << answers[2] << endl;
        return 0;
}
```

Task C ()

```cpp
#include <iostream>
#include <vector>
#include <string>
#include <cmath>
#include <algorithm>
#include <map>
#include <set>
#include <random>
#include <queue>

#define X first
#define Y second
#define mp make_pair
#define rev(i, n) for (int i = 0; i < n; ++i)
#define forn(n) for (int i = 0; i < n; ++i)
#define rrev(i, n) for (int i = n; i >= 0; ++i)

using namespace std;

typedef long long ll;
typedef long double ld;

int main() {
        ios_base::sync_with_stdio(0);
        cin.tie(0);
        int t; cin >> t;
        while (t--) {
                string s; cin >> s;
                int cnt0 = 0, cnt1 = 0, cnt2 = 0;
                forn(s.size()) {
                        if (s[i] == '0') cnt0++;
                        else if (s[i] == '1') cnt1++;
                        else cnt2++;
                }
                if (cnt2 == 0) {
                        if (cnt0 == cnt1) {
                                if (cnt1 % 2) forn(s.size()) if (s[i] == '1') s[i] = '?';
                                if (cnt0 % 2 == 0) forn(s.size()) if (s[i] == '0') s[i] = '?';
                        }
                        else if (cnt0 > cnt1) {
                                int q = 0;
                                forn(s.size()) if (q < cnt0 - (cnt0 % 2) && s[i] == '0') s[i] = '?
                                        ', q++;
                        }
                        else {
                                int q = 0;
                                forn(s.size()) if (q < cnt1 - (1 - cnt1 % 2) && s[i] == '1') s[i]
                                        = '?', q++;
                        }
                }
                else {
                        if (cnt2 % 2){
                                forn(s.size()) if (s[i] == '?') s[i] = '1';
                        }
                        else {
                                forn(s.size()) if (s[i] == '?') s[i] = '0';
                        }
                }
                cout << s << '\n';
        }
        return 0;
}
```

Task D ()

```cpp
#include <iostream>
#include <fstream>
#include <vector>
#include <string>
#include <cmath>
#include <algorithm>
#include <map>
#include <set>
#include <random>
#include <queue>

#define X first
#define Y second
#define mp make_pair
#define rev(i, n) for (int i = 0; i < n; ++i)
#define forn(n) for (int i = 0; i < n; ++i)
#define rrev(i, n) for (int i = n; i >= 0; ++i)

using namespace std;

typedef long long ll;
typedef long double ld;

int main() {
        ios_base::sync_with_stdio(0);
        cin.tie(0);
        ll f = 1, n, mod = 998244353, ans;
        vector<ll> v = { 1, 174071185, 25316168, 390468437, 141501910, 108338295, 996552400,
            287092800, 374428494, 575746938, 641848989, 726696364, 223630480, 170994502,
            136316264, 271858572, 911660635, 82590180, 853719046, 989105856, 399620140, 502567950,
             128884610, 317282634, 454654676, 238554106, 675835510, 795062882, 502240551,
            426208428, 832928086, 235674167, 998244352 };
        cin >> n, n++;
        //if (n >= mod * mod) n /= 0;
        ans = n / mod + n / (mod * mod);
        if ((n / mod) & 1) f = mod - 1;
        n %= mod;
        ll q = n / (mod / 32);
        f *= v[q], f %= mod;
        for (ll i = q * (mod / 32) + 1; i <= n; ++i) {
                f *= i, f %= mod;
        }
        cout << ans << '_' << f << endl;
        return 0;
}
```

Task E ()

```cpp
#include <iostream>
#include <vector>
#include <string>
#include <cmath>
#include <algorithm>
#include <map>
#include <set>
#include <random>
#include <queue>

#define X first
#define Y second
#define mp make_pair
#define rev(i, n) for (int i = 0; i < n; ++i)
#define forn(n) for (int i = 0; i < n; ++i)
#define rrev(i, n) for (int i = n; i >= 0; ++i)

using namespace std;

typedef long long ll;
typedef long double ld;

int main() {
        ios_base::sync_with_stdio(0);
        cin.tie(0);
        int n; cin >> n;
        vector<int> v(n);
        forn(n) cin >> v[i];
        int q; cin >> q;
        while (q--) {
                int a, b, d; cin >> a >> b >> d;
                ll s = 0;
                for (int i = a; i < b; ++i) {
                        s += (d + v[i] - 1) / v[i];
                }
                cout << s << '\n';
        }
        return 0;
}
```

Task F ()

```cpp
#include <iostream>
#include <vector>
#include <string>
#include <cmath>
#include <algorithm>
#include <map>
#include <set>
#include <random>
#include <queue>

#define X first
#define Y second
#define mp make_pair
#define rev(i, n) for (int i = 0; i < n; ++i)
#define forn(n) for (int i = 0; i < n; ++i)
#define rrev(i, n) for (int i = n; i >= 0; ++i)

using namespace std;

typedef long long ll;
typedef long double ld;

int f(vector<ll> &mi, vector<ll> &ma, int idx) {
        int res = 0;
        for (int i = idx + 1; i < ma.size(); ++i) {
                if (ma[i] - ma[idx] >= 0 && mi[i] - mi[idx] <= 0) {
                        res = max(res, 1 + f(mi, ma, i));
                }
        }
        return res;
}

int main() {
        ios_base::sync_with_stdio(0);
        cin.tie(0);
        int n; cin >> n;
        vector<ll> mi(n + 1), ma(n + 1);
        forn(n) {
                int l, r; cin >> l >> r;
                mi[i + 1] = mi[i] + l;
                ma[i + 1] = ma[i] + r;
        }
        int ans = 0, cnt;
        forn(n + 1) {
                ans = max(ans, f(mi, ma, i));
        }
        cout << ans + 1 << endl;
        return 0;
}
```