Олимпиада СПбГУ по информатике 2021/22 учебного года

A	B	C	D	E	F	Sum
100	100	100	60	58	94	512

Task A ()

```cpp
//#pragma GCC optimize("O3,unroll-loops")
//#pragma GCC optimize("fast-math")
//#pragma GCC target("avx,avx2,fma")
#include <bits/stdc++.h>

using namespace std;
using ll = long long;
const int MAXN = 101;
const ll mod = 1e9 + 7;


void solve() {
    int n;
    cin >> n;
    vector<pair<int, int>> s;
    for (int i = 0; i < n; ++i) {
        int ai, bi;
        cin >> ai >> bi;
        while (ai % 10 == 0) {
            ai /= 10;
            bi++;
        }
        s.emplace_back(bi, ai);
    }
    sort(s.begin(), s.end());
    ll sum = s[0].second;
    ll pref = s[0].first;
    for (int i = 1; i < n; i++) {
        while (pref != s[i].first) {
            if (sum % 10)
                goto ABOBA;
            sum /= 10;
            pref++;
        }
        sum += s[i].second;
    }
    ABOBA:
    while (sum%10 == 0){
        sum/=10;
        pref++;
    }
    cout << pref;

}


signed main() {
#ifdef LOCAL
    freopen("input.txt", "r", stdin);
#endif
    ios::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
    int t = 1;
//    cin >> t;
    while (t--)
```

```
        solve();
    return 0;
}
```

Task B ()

```cpp
//#pragma GCC optimize("O3,unroll-loops")
//#pragma GCC optimize("fast-math")
//#pragma GCC target("avx,avx2,fma")
#include <bits/stdc++.h>

using namespace std;
using ll = long long;
const int MAXN = 101;
const ll mod = 1e9 + 7;
int n;
int k[MAXN];


string fw = "Flip_and_wait";
string w = "Wait";
string s = "Stop";

void wait(int t) {
    int sum = 0;
    while (sum < t) {
        if (sum == 0)
            cout << fw << endl;
        else
            cout << w << endl;
        string s;
        cin >> s;
        int cnt = ((int) s.size() - 3) / 2;
        sum += cnt;
    }
}

void solve() {
    cin >> n;
    for (int i = 0; i < n; i++)
        cin >> k[i];
    for (int i = n - 1; i >= 0; i--) {
        while (k[i] != 0) {
            wait(i + 1);
            k[i]--;
        }
    }
    cout << s << endl;
}


signed main() {
#ifdef LOCAL
//    freopen("input.txt", "r", stdin);
#endif
//    ios::sync_with_stdio(0);
//    cin.tie(0);
//    cout.tie(0);
    int t = 1;
//    cin >> t;
    while (t--)
        solve();
    return 0;
}
```

Task C ()

```cpp
//#pragma GCC optimize("O3")

#include <bits/stdc++.h>

using namespace std;
#define MAXN 100005
#define MAXM 100005
#define mix(a, b) a = min(a,b)
using ll = long long;
const ll mod = 1e9 + 7;


void solve() {
    string s;
    cin >> s;
    int n = s.size();
    int cnta = 0, cnt1 = 0;
    for (char c : s) {
        cnta += c == '?';
        cnt1 += c == '1';
    }
    if (cnta != 0) {
        for (char &c : s) {
            if (c == '?')
                c = '0' + cnta % 2;
        }
        cout << s << '\n';
    } else {
        if (cnt1 > n / 2) {
            int cnt = 0;
            for (char &c : s) {
                if (c == '1' && !(cnt >= n / 2 && cnt % 2)) {
                    c = '?';
                    cnt++;
                }
            }
            cout << s << '\n';
        } else if ((n - cnt1) > n / 2) {
            int cnt = 0;
            for (char &c : s) {
                if (c == '0' && !(cnt >= n / 2 && cnt % 2 == 0)) {
                    c = '?';
                    cnt++;
                }
            }
            cout << s << '\n';
        } else {
            if (n / 2 % 2) {
                for (char &c : s) {
                    if (c == '1')
                        c = '?';
                }
            } else {
                for (char &c : s) {
                    if (c == '0')
                        c = '?';
                }
            }
            cout << s <<'\n';
        }
    }
}

signed main() {
#ifdef LOCAL
    freopen("input.txt", "r", stdin);
#endif
    ios::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
    int t = 1;
    cin >> t;
```

```
    while (t--)
        solve();
    return 0;
}
```

Task D ()

```cpp
#pragma GCC optimize("Ofast")
//#pragma GCC optimize("fast-math")
//#pragma GCC target("avx,avx2,fma")
#include <bits/stdc++.h>

using namespace std;
using ll = long long;
const int MAXN = 1e6 + 1;
const ll mod = 998244353;


ll modd(ll x) {
    if (x < mod)
        return x;
    return x % mod;
}

void solve() {
    ll n;
    cin >> n;
    ll a, b, c;
    a = 1;
    b = 2;
    c = 2;
    for (int i = 2; i <= n; i++) {
        c = modd(a * i) * i + b;
        c = modd(c);
        a = b;
        b = c;
    }
    cout << 0 << '_' << modd(c);
}


signed main() {
#ifdef LOCAL
    freopen("input.txt", "r", stdin);
#endif
    ios::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
    int t = 1;
//    cin >> t;
    while (t--)
        solve();
    return 0;
}
```

Task E ()

```cpp
#pragma GCC optimize("Ofast")
#pragma GCC optimize("fast-math")
#pragma GCC target("avx,avx2,fma")
#include <bits/stdc++.h>

using namespace std;
#define MAXN 100005
#define MAXM 100005
#define mix(a, b) a = min(a,b)
using ll = long long;
const ll mod = 1e9 + 7;


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

signed main() {
#ifdef LOCAL
    freopen("input.txt", "r", stdin);
#endif
    ios::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
    int t = 1;
//    cin >> t;
    while (t--)
        solve();
    return 0;
}
```

Task F ()

```cpp
#pragma GCC optimize("O3")
#pragma GCC optimize("unroll-loops")
#include <bits/stdc++.h>

using namespace std;
#define MAXN 200005
#define MAXM 100005
#define mix(a, b) a = min(a,b)
using ll = long long;
const ll inf = 1e12;


void solve() {
    int n;
    cin >> n;
    vector<pair<ll, ll>> s(n);
    for (auto &i : s)
        cin >> i.first >> i.second;
    vector<int> dp(n + 1,1);
    vector<int> maxx(n+1,1);
    for (int i = 1; i <= n; i++) {
        ll l = 0, r=0;
        for (int j = i - 1; j >= max(0,i-1850); j--) {
            l += s[j].first;
            r += s[j].second;
            if(maxx[j] + 1 < dp[i] + 1)
                break;
            if (l <= 0 && 0 <= r)
                dp[i] = max(dp[i], dp[j] + 1);
        }
        maxx[i] = max(dp[i],maxx[i-1]);
    }
    cout << maxx[n];
}

signed main() {
#ifdef LOCAL
    freopen("input.txt", "r", stdin);
#endif
    int t = 1;
//    cin >> t;
    while (t--)
        solve();
    return 0;
}
```