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
#include <bits/stdc++.h>
#define x first
#define y second
#define pb push_back
#define sz(a) (int)a.size()
#define int long long

using namespace std;

multiset <pair <int, int>> v;

signed main() {
    ios_base::sync_with_stdio(0);
    cin.tie(0);
    int n, x, y;
    cin >> n;
    for (int i = 0; i < n; ++i) {
        cin >> x >> y;
        while (x % 10 == 0) {
            x /= 10;
            y++;
        }
        v.insert({y, x});
    }
    int ans = 0;
    int t = 0;
    while (sz(v) > 0) {
        int mn = v.begin()->x - t;
        ans += mn;
        int p = 0;
        while (sz(v) > 0 && v.begin()->x == t + mn) {
            p += v.begin()->y;
            v.erase(v.begin());
        }
        t += mn;
        int f = 0;
        while (p % 10 == 0) {
            p /= 10;
            f++;
        }
        v.insert({t + f, p});
        if (f == 0)
            break;
    }
    cout << ans << '\n';
    return 0;
}
```

Task B ()

```cpp
#include <bits/stdc++.h>
#define x first
#define y second
#define pb push_back
#define sz(a) (int)a.size()

using namespace std;

typedef long long ll;

int k[110];

int get(int type) {
    if (type == 1) {
        cout << "Wait" << endl;
    } else if (type == 2) {
        cout << "Flip_and_wait" << endl;
    } else {
        cout << "Stop" << endl;
        return 0;
    }
    string s;
    cin >> s;
    if (s[0] != 'B' || s == "Burn")
        exit(0);
    int cnt = 0;
    for (auto i : s) {
        if (i == 'e')
            cnt++;
    }
    return cnt / 2;
}

signed main() {
    ios_base::sync_with_stdio(0);
    cin.tie(0);
    int n;
    cin >> n;
    for (int i = 0; i < n; ++i)
        cin >> k[i];
    for (int i = n - 1; i >= 0; --i) {
        for (int j = 0; j < k[i]; ++j) {
            int pp = 0;
            int f = get(2);
            while (true) {
                pp += f;
                if (pp >= i + 1)
                    break;
                f = get(1);
            }
        }
    }
    get(3);
    return 0;
}
```

Task C ()

```cpp
#include <bits/stdc++.h>
#define x first
#define y second
#define pb push_back
#define sz(a) (int)a.size()
//#define int long long

using namespace std;

void solve();

signed main() {
    ios_base::sync_with_stdio(0);
    cin.tie(0);
    int t = 1;
    cin >> t;
    while (t--)
        solve();
    return 0;
}

mt19937 rng(43291481);

void solve() {
    string s;
    cin >> s;
    int n = sz(s);
    bool f = false;
    for (int i = 0; i < n; ++i) {
        if (s[i] == '?') {
            f = true;
            break;
        }
    }
    vector <int> v;
    for (int i = 0; i < n; ++i)
        v.pb(i);
    shuffle(v.begin(), v.end(), rng);
    if (!f) {
        int cnt1 = 0, cnt2 = 0;
        for (int i = 0; i < n; ++i) {
            if (s[i] == '0')
                cnt1++;
            else
                cnt2++;
        }
        if (cnt1 == 0) {
            for (int i = 0; i < n; ++i) {
                s[i] = '?';
            }
        } else if (cnt2 == 0) {
            for (int i = 0; i < n / 2; ++i)
                s[v[i]] = '?';
        } else if (cnt1 >= cnt2) {
            for (int i = 0; i < n; ++i) {
                if (s[i] == '0')
                    s[i] = '?';
            }
        } else {
            for (int i = 0; i < n; ++i) {
                if (s[i] == '1')
                    s[i] = '?';
            }
        }
        cout << s << '\n';
    } else {
        bool dd = true;
        for (int i = 0; i < n / 2; ++i) {
            if (s[v[i]] != '?') {
                dd = false;
                break;
            }
```

```cpp
        }
        int cntq = 0;
        bool tt = false;
        for (int i = 0; i < n; ++i) {
            if (s[i] == '?')
                cntq++;
            else if (s[i] == '0')
                tt = true;
        }
        if (cntq == n / 2 && dd && tt) {
            for (int i = 0; i < n; ++i) {
                s[i] = '0';
            }
            cout << s << '\n';
            return;
        }
        int f1 = 0;
        for (int i = 0; i < n; ++i) {
            if (s[i] == '0')
                f1 = 1;
            if (s[i] == '1')
                f1 = 2;
        }
        if (f1 == 1) {
            for (int i = 0; i < n; ++i) {
                if (s[i] == '?')
                    s[i] = '1';
            }
        } else if (f1 == 2) {
            for (int i = 0; i < n; ++i) {
                if (s[i] == '?')
                    s[i] = '0';
            }
        } else {
            for (int i = 0; i < n; ++i)
                s[i] = '1';
        }
        cout << s << '\n';
    }
}
```

Task D ()

```cpp
#include <bits/stdc++.h>
#define x first
#define y second
#define pb push_back
#define sz(a) (int)a.size()
#define int long long

using namespace std;

typedef long long ll;

const int mod = 998244353;

signed main() {
    ios_base::sync_with_stdio(0);
    cin.tie(0);
    int n;
    cin >> n;
    int s = 0;
    ll pr = 1, x;
    int ans = 1;
    for (int i = 2; i <= n; ++i) {
        x = ((i * i) % mod) * (s + 1) % mod;
        s = (s + pr) % mod;
        pr = x;
        ans += x;
        ans %= mod;
    }
    cout << "0 " << (ans + 1) % mod << endl;
    return 0;
}
```

Task E ()

```cpp
#include <bits/stdc++.h>
#define x first
#define y second
#define pb push_back
#define sz(a) (int)a.size()
//#define int long long

using namespace std;

typedef long long ll;

int a[300010];

signed main() {
    ios_base::sync_with_stdio(0);
    cin.tie(0);
    int n;
    cin >> n;
    for (int i = 0; i < n; ++i) {
        cin >> a[i];
    }
    int q, l, r, d;
    cin >> q;
    for (int i = 0; i < q; ++i) {
        cin >> l >> r >> d;
        ll ans = 0;
        for (int j = l; j < r; ++j) {
            ans += (d + a[j] - 1) / a[j];
        }
        cout << ans << "\n";
    }
    return 0;
}
```

Task F ()

```cpp
#include <bits/stdc++.h>
#define x first
#define y second
#define pb push_back
#define sz(a) (int)a.size()

using namespace std;

typedef long long ll;

int dp[1000010];

int l[1000010], r[1000010];

signed main() {
    ios_base::sync_with_stdio(0);
    cin.tie(0);
    int n;
    cin >> n;
    for (int i = 0; i < n; ++i) {
        cin >> l[i] >> r[i];
    }
    int mx = 1;
    dp[0] = 1;
    for (int i = 1; i <= n; ++i) {
        ll f1 = 0, f2 = 0;
        dp[i] = 1;
        for (int j = i - 1; j >= max(0, i - 2000); --j) {
            f1 += l[j];
            f2 += r[j];
            if (f1 <= 0 && 0 <= f2) {
                dp[i] = max(dp[i], dp[j] + 1);
            }
        }
        mx = max(mx, dp[i]);
    }
    cout << mx;
    return 0;
}
```