

Олимпиада СПбГУ по информатике 2021/22 учебного года

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

Task A ()

```
#include "bits/stdc++.h"
using namespace std;
using ll = long long;
using ld = long double;
#define int ll
using pii = pair<int, int>;
using pld = pair<ld, ld>;
using vpii = vector<pii>;
using vint = vector<int>;
using ar3 = array<int, 3>;
using ar4 = array<int, 4>;
using va3 = vector<ar3>;
using va4 = vector<ar4>;

#define F first
#define S second
#define mp make_pair
#define pb push_back
#define pob pop_back
#define _bp __builtin_popcount
#define all(arr) (arr).begin(), (arr).end())
#define range(i, n) for (int i = 0; i < n; ++i)
#define sz(arr) int((arr).size())
#define sort stable_sort
const int N = 2e5+5;
const int Inf = 1e9+7;
const ll inf = 1e18+7;

// #define cerr if (0) cerr

int n;

void solve() {
    cin >> n;
    vint a(n), b(n);
    range(i, n) {
        cin >> a[i] >> b[i];
        while (a[i] % 10 == 0) {
            a[i] /= 10;
            ++b[i];
        }
    }
    int mn = *min_element(all(b));
    int ans = mn;
    range(i, n) {
        b[i] -= mn;
    }
    vint ind(n);
    iota(all(ind), 0);
    sort(all(ind), [&](int i, int j) {return b[i] < b[j];});
    int ptr = 0;
    int per = 0;
    for (int cnt = 0; ; ++cnt) {
        int sm = 0;
        while (ptr < n && b[ind[ptr]] == cnt) {
            sm += a[ind[ptr]];
        }
    }
}
```

```

        ++ptr;
    }
    if ((sm + per) % 10 == 0) {
        ans += 1;
    } else {
        break;
    }
    per = (sm + per) / 10;
}
cout << ans << '\n';
}

signed main() {
    int tt = 1;
    ios_base::sync_with_stdio(0);
    cout << setprecision(11) << fixed;
    cin.tie(NULL);
    // cin >> tt;
    while (tt--) {
        solve();
    }
}

```

Task B ()

```
#include "bits/stdc++.h"
using namespace std;
using ll = long long;
using ld = long double;
#define int ll
using pii = pair<int, int>;
using pld = pair<ld, ld>;
using vpii = vector<pii>;
using vint = vector<int>;
using ar3 = array<int, 3>;
using ar4 = array<int, 4>;
using va3 = vector<ar3>;
using va4 = vector<ar4>;

#define F first
#define S second
#define mp make_pair
#define pb push_back
#define pob pop_back
#define _bp __builtin_popcount
#define all(arr) (arr).begin(), (arr).end())
#define range(i, n) for (int i = 0; i < n; ++i)
#define sz(arr) int((arr).size())
#define sort stable_sort
const int N = 2e5+5;
const int Inf = 1e9+7;
const ll inf = 1e18+7;

// #define cerr if (0) cerr

int n;

int in() {
    string s;
    cin >> s;
    int x = 0;
    for (char c: s) {
        x += (c == 'e');
    }
    return x / 2;
}

int cnt = 0;

void wait() {
    ++cnt;
    cout << "Wait" << endl;
}

void stop() {
    ++cnt;
    cout << "Stop" << endl;
}

void flip() {
    ++cnt;
    cout << "Flip_and_wait" << endl;
}

void solve() {
    cin >> n;
    vint k(n);
    range(i, n) {
        cin >> k[i];
    }
    for (int i = n - 1; i > -1; --i) {
        for (int j = 0; j < k[i]; ++j) {
            flip();
            int kek = in();
            while (kek <= i) {
                wait();
                kek += in();
            }
        }
    }
}
```

```

        }
    }
    stop();
}
//pls test
signed main() {
    int tt = 1;
    ios_base::sync_with_stdio(0);
    cout << setprecision(11) << fixed;
    cin.tie(NULL);
    // cin >> tt;
    while (tt--) {
        solve();
    }
}

```

Task C ()

```
#include "bits/stdc++.h"
using namespace std;
using ll = long long;
using ld = long double;
#define int ll
using pii = pair<int, int>;
using pld = pair<ld, ld>;
using vpii = vector<pii>;
using vint = vector<int>;
using ar3 = array<int, 3>;
using ar4 = array<int, 4>;
using va3 = vector<ar3>;
using va4 = vector<ar4>;

#define F first
#define S second
#define mp make_pair
#define pb push_back
#define pob pop_back
#define _bp __builtin_popcount
#define all(arr) (arr).begin(), (arr).end())
#define range(i, n) for (int i = 0; i < n; ++i)
#define sz(arr) int((arr).size())
#define sort stable_sort
const int N = 2e5+5;
const int Inf = 1e9+7;
const ll inf = 1e18+7;

// #define cerr if (0) cerr

int n;

void solve() {
    string s;
    cin >> s;
    int cnt = 0;
    n = sz(s);
    range(i, n) {
        cnt += s[i] == '?';
    }
    if (cnt == 0) {
        range(i, n / 2) {
            if (s[i * 2] == '0') {
                if (s[i * 2 + 1] == '0') {
                    cout << "?0";
                } else {
                    cout << "0?";
                }
            } else {
                if (s[i * 2 + 1] == '0') {
                    cout << "1?";
                } else {
                    cout << "?1";
                }
            }
        }
        if (n & 1) {
            cout << s.back();
        }
    } else {
        range(i, n / 2) {
            if (s[i * 2] == '?') {
                if (s[i * 2 + 1] == '0') {
                    cout << "00";
                } else {
                    cout << "11";
                }
            } else {
                if (s[i * 2] == '0') {
                    cout << "01";
                } else {
                    cout << "10";
                }
            }
        }
    }
}
```

```

        }
    }
    if (n & 1) {
        cout << s.back();
    }
}
cout << '\n';
}

signed main() {
    int tt = 1;
    ios_base::sync_with_stdio(0);
    cout << setprecision(11) << fixed;
    cin.tie(NULL);
    cin >> tt;
    while (tt--) {
        solve();
    }
}

```

Task D ()

```
#include "bits/stdc++.h"
using namespace std;
using ll = long long;
using ld = long double;
#define int ll
using pii = pair<int, int>;
using pld = pair<ld, ld>;
using vpii = vector<pii>;
using vint = vector<int>;
using ar3 = array<int, 3>;
using ar4 = array<int, 4>;
using va3 = vector<ar3>;
using va4 = vector<ar4>;

#define F first
#define S second
#define mp make_pair
#define pb push_back
#define pob pop_back
#define _bp __builtin_popcount
#define all(arr) (arr).begin(), (arr).end())
#define range(i, n) for (int i = 0; i < n; ++i)
#define sz(arr) int((arr).size())
#define sort_stable_sort
const int N = 2e5+5;
const int Inf = 1e9+7;
const ll inf = 1e18+7;
const int Mod = 998244353;
// #define cerr if (0) cerr

// struct mt {
//     int n, m;
//     int a[2][2];
//     mt(int _n, int _m) {n = _n; m = _m; a[0][0] = a[0][1] = a[1][0] = a[1][1] = 0;}
// }

// mt mul(mt p1, mt p2) {
//     int k = p1.m;
//     mt ans(p1.n, p2.m);
//     range(i, p1.n) {
//         range(j, p2.m) {
//             range(t, k) {
//                 ans.a[i][j] += p1.a[i][t] * p1.a[t][j];
//             }
//         }
//     }
//     return ans;
// }

// mt pw(mt mat, int p) {
//     if (p == 1) {
//         return mat;
//     }
//     mt kek = pw(mat, p / 2);
//     if (p & 1) {
//         kek = mul(kek, mat);
//     }
//     return kek;
// }

int n;
int a[] = {1, 808258749, 117153405, 761699708, 573994984, 62402409, 511621808, 242726978,
887890124, 875880304};

int mul(int x, int y) {return (x * y) % Mod;}
int pw(int x, int p) {if (p == 0) return 1; int t = pw(x, p / 2); t = mul(t, t); if (p & 1) t = mul(t, x); return t;}

void solve() {
    cin >> n;
    ++n;
    int susik = n / Mod + n / (Mod * Mod);
```

```

int dob = 1;
dob = pw(Mod - 1, n / Mod);
n %= Mod;
int aaaa = n / 100000000;
int x = mul(a[aaaa], dob);
int j;
for (int i = aaaa * 100000000 + 1; i <= n; ++i) {
    j = i;
    while (j % Mod == 0) {
        j /= Mod;
    }
    (x *= j) %= Mod;
}
cout << susik << "␣" << x << '\n';
return;
// range(i, n + 1) {
//     cerr << i << ' ' << dp[i] << '\n';
// }
}

signed main() {
    int tt = 1;
    ios_base::sync_with_stdio(0);
    cout << setprecision(11) << fixed;
    cin.tie(NULL);
    // cin >> tt;
    while (tt--) {
        solve();
    }
}

```


Task E ()

```
#include "bits/stdc++.h"
using namespace std;
using ll = long long;
using ld = long double;
#define int ll
using pii = pair<int, int>;
using pld = pair<ld, ld>;
using vpii = vector<pii>;
using vint = vector<int>;
using ar3 = array<int, 3>;
using ar4 = array<int, 4>;
using va3 = vector<ar3>;
using va4 = vector<ar4>;

#define F first
#define S second
#define mp make_pair
#define pb push_back
#define pob pop_back
#define _bp __builtin_popcount
#define all(arr) (arr).begin(), (arr).end())
#define range(i, n) for (int i = 0; i < n; ++i)
#define sz(arr) int((arr).size())
#define sort_stable_sort
const int N = 2e5+5;
const int Inf = 1e9+7;
const ll inf = 1e18+7;

// #define cerr if (0) cerr

int n;

void solve() {
    cin >> n;
    vint v(n);
    range(i, n) {
        cin >> v[i];
    }
    int q; cin >> q;
    range(qq, q) {
        int a, b, d;
        cin >> a >> b >> d;
        int t1 = 0;
        for (int i = a; i < b; ++i) {
            t1 += (d + v[i] - 1) / v[i];
        }
        cout << t1 << '\n';
    }
}

signed main() {
    int tt = 1;
    ios_base::sync_with_stdio(0);
    cout << setprecision(11) << fixed;
    cin.tie(NULL);
    // cin >> tt;
    while (tt--) {
        solve();
    }
}
```

Task F ()

```
#include "bits/stdc++.h"
using namespace std;
using ll = long long;
using ld = long double;
#define int ll
using pii = pair<int, int>;
using pld = pair<ld, ld>;
using vpii = vector<pii>;
using vint = vector<int>;
using ar3 = array<int, 3>;
using ar4 = array<int, 4>;
using va3 = vector<ar3>;
using va4 = vector<ar4>;

#define F first
#define S second
#define mp make_pair
#define pb push_back
#define pob pop_back
#define _bp __builtin_popcount
#define all(arr) (arr).begin(), (arr).end())
#define range(i, n) for (int i = 0; i < n; ++i)
#define sz(arr) int((arr).size())
#define sort stable_sort
const int N = 41;
const int Inf = 1e9+7;
const ll inf = 1e18+7;

// #define cerr if (0) cerr

int n;
pii dp[N][N];
const int M = N * 100;
int cnt[N][M * 2 + 1];

void solve() {
    cin >> n;
    vpii a(n);
    range(i, n) {
        cin >> a[i].F >> a[i].S;
        dp[i][i] = a[i];
    }
    for (int i = 0; i < n; ++i) {
        for (int j = i + 1; j < n; ++j) {
            dp[i][j] = {dp[i][j - 1].F + a[j].F, dp[i][j - 1].S + a[j].S};
        }
    }
    cnt[0][M] = 1;
    for (int i = 0; i < n; ++i) {
        range(k, M * 2 + 1) {
            for (int j = i + 1; j <= n; ++j) {
                for (int tmp = dp[i][j - 1].F; tmp <= dp[i][j - 1].S; ++tmp) {
                    if (k + tmp >= 0 && k + tmp <= M * 2) {
                        cnt[j][k + tmp] = max(cnt[j][k + tmp], cnt[i][k] +
                                                (tmp == 0));
                    }
                }
            }
        }
    }
    int ans = 0;
    range(j, n + 1) {
        range(i, M * 2 + 1) {
            ans = max(ans, cnt[j][i]);
        }
    }
    cout << ans;
}

signed main() {
    int tt = 1;
    ios_base::sync_with_stdio(0);
```

```
cout << setprecision(11) << fixed;  
cin.tie(NULL);  
// cin >> tt;  
while (tt--) {  
    solve();  
}  
}
```