

Олимпиада СПбГУ по информатике 2021/22 учебного года

A	B	C	D	E	F	Sum
100	100	100	80	58	31	469

Task A ()

```
//Komershan
//@defineintlonglong (telegramm channel)
#include <iostream>
#include <vector>
#include <algorithm>
#include <string>
#include <cmath>
#include <queue>
#include <unordered_set>
#include <map>
#include <set>
#include <random>
using namespace std;

//for coding
typedef long long ll;
typedef long double ld;
#define all(x) x.begin(), x.end()
#define rd(x) for (auto &i : x) cin >> i;
#define rep(i, l, r) for (int i = (l); i < (r); i++)

//for debug
#define ct(x) for (auto i : x) cout << i << ' ';

inline void operator delete (void*) { }

mt19937_64 rnd(239);

signed main() {
    ios::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
    cout.precision(12);
    int n;
    cin >> n;
    map<int, int> cnt;
    for (int i = 0; i < n; i++) {
        int a, b;
        cin >> a >> b;
        string k = to_string(a);
        for (int j = k.size() - 1; j >= 0; j--) {
            if (k[j] - '0')
                cnt[b + (k.size() - 1 - j)] += k[j] - '0';
        }
    }
    while (true) {
        map<int, int> ::iterator it = cnt.begin();
        pair<int, int> val = { it->first, it->second };
        if (val.second / 10 > 0) {
            cnt[val.first + 1] += val.second / 10;
            cnt[val.first] = val.second % 10;
            if (!(val.second % 10)) {
                cnt.erase(val.first);
            }
        }
        else
            break;
    }
```

```
    }  
    else {  
        break;  
    }  
}  
map<int, int>::iterator it = cnt.begin();  
cout << it->first;  
}
```

Task B ()

```
//Komershan
//@defineintlonglong (telegramm channel)
#include <iostream>
#include <vector>
#include <algorithm>
#include <string>
#include <cmath>
#include <queue>
#include <unordered_set>
#include <map>
#include <set>
#include <random>
using namespace std;

//for coding
typedef long long ll;
typedef long double ld;
#define all(x) x.begin(), x.end()
#define rd(x) for (auto &i : x) cin >> i;
#define rep(i, l, r) for (int i = (l); i < (r); i++)

//for debug
#define ct(x) for (auto i : x) cout << i << ' ';

inline void operator delete (void*) { }

mt19937_64 rnd(239);

signed main() {
    ios::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
    cout.precision(12);
    int n;
    cin >> n;
    vector<int> k(n);
    for (auto& i : k)
        cin >> i;
    int ma = 0;
    for (int i = 0; i < n; i++) {
        if (k[i])
            ma = i;
    }
    cout << "Flip_and_wait" << endl;
    string ans;
    int cnt = 0;
    while (cin >> ans) {
        int val = 0;
        for (auto i : ans) {
            if (i == 'e')
                val++;
        }
        cnt += val / 2;
        if (cnt >= ma + 1) {
            k[ma]--;
            ma = -1;
            for (int i = 0; i < n; i++) {
                if (k[i])
                    ma = i;
            }
            if (ma == -1) {
                cout << "Stop" << endl;
                return 0;
            }
            cout << "Flip_and_wait" << endl;
            cnt = 0;
        }
        else
            cout << "Wait" << endl;
    }
}
```

Task C ()

```
//Komershan
//@defineintlonglong (telegramm channel)
#include <iostream>
#include <vector>
#include <algorithm>
#include <string>
#include <cmath>
#include <queue>
#include <unordered_set>
#include <map>
#include <set>
#include <random>
using namespace std;

//for coding
typedef long long ll;
typedef long double ld;
#define all(x) x.begin(), x.end()
#define rd(x) for (auto &i : x) cin >> i;
#define rep(i, l, r) for (int i = (l); i < (r); i++)

//for debug
#define ct(x) for (auto i : x) cout << i << ' ';

inline void operator delete (void*) { }

mt19937_64 rnd(239);

signed main() {
    ios::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
    cout.precision(12);
    int t;
    cin >> t;
    while (t--) {
        string s;
        cin >> s;
        bool istrue = false;
        for (auto i : s) {
            if (i == '?')
                istrue = true;
        }
        if (istrue) {
            int cnt = 0;
            for (int i = 0; i < s.size(); i++) {
                cnt += (s[i] == '?');
            }
            if (cnt == s.size()) {
                for (auto i : s)
                    cout << '1';
                cout << '\n';
            }
            else if (cnt == s.size() - 1 && s[0] == '0') {
                for (auto i : s)
                    cout << '0';
                cout << '\n';
            }
            else if (cnt == s.size() - 2 && s[0] == '0' && s[1] == '1') {
                cout << '0';
                for (int i = 0; i < s.size() - 1; i++)
                    cout << '1';
                cout << '\n';
            }
            else {
                char el;
                for (auto i : s) {
                    if (i != '?')
                        el = i;
                }
                el = (el - '0') ^ 1 + '0';
                for (auto i : s) {
```


Task D ()

```
//Komershan
//@defineintlonglong (telegramm channel)
#include <iostream>
#include <vector>
#include <algorithm>
#include <string>
#include <cmath>
#include <queue>
#include <unordered_set>
#include <map>
#include <set>
#include <random>
using namespace std;

//for coding
typedef long long ll;
typedef long double ld;
#define all(x) x.begin(), x.end()
#define rd(x) for (auto &i : x) cin >> i;
#define rep(i, l, r) for (int i = (l); i < (r); i++)

//for debug
#define ct(x) for (auto i : x) cout << i << '␣';

inline void operator delete (void*) { }

mt19937_64 rnd(239);

const ll mod = 998244353;

vector<ll> precalc = { 1, 808258749, 117153405, 761699708, 573994984, 62402409, 511621808,
    242726978, 887890124, 875880304, 0 };

ll bpow(ll val, ll x) {
    if (!x)
        return 1;
    if (x % 2)
        return (val * bpow(val, x - 1)) % mod;
    else
        return bpow((val * val) % mod, x / 2);
}

signed main() {
    ios::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
    cout.precision(12);
    ll f = 1;
    ll n;
    cin >> n;
    n++;
    int pw = 1;
    ll cnt = 0;
    if (n >= mod)
        cnt = 1;
    if (n >= mod * mod)
        cnt = 3;
    n %= mod;
    int id = 0;
    while (id + 1 < precalc.size() && (id + 1) * 1e8 <= n)
        id++;
    ll res = precalc[id];
    for (int i = id * 1e8 + 1; i <= n; i++)
        res = (res * ll(i)) % mod;
    cout << cnt << '␣' << (res * bpow(998244352, cnt)) % mod;
}
```

Task E ()

```
//Komershan
//@defineintlonglong (telegramm channel)
#include <iostream>
#include <vector>
#include <algorithm>
#include <string>
#include <cmath>
#include <queue>
#include <unordered_set>
#include <map>
#include <set>
#include <random>
using namespace std;

//for coding
typedef long long ll;
typedef long double ld;
#define all(x) x.begin(), x.end()
#define rd(x) for (auto &i : x) cin >> i;
#define rep(i, l, r) for (int i = (l); i < (r); i++)

//for debug
#define ct(x) for (auto i : x) cout << i << ' ';

inline void operator delete (void*) { }

mt19937_64 rnd(239);

const int mod = 998244353;

#define int long long

signed main() {
    ios::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
    cout.precision(12);
    int n;
    cin >> n;
    vector<int> v(n);
    rd(v);
    int q;
    cin >> q;
    while (q--) {
        int l, r, d;
        cin >> l >> r >> d;
        r--;
        int res = 0;
        for (int i = l; i <= r; i++) {
            res += d / v[i] + min(d % v[i], ll(1));
        }
        cout << res << '\n';
    }
}
```

Task F ()

```
//Komershan
//@defineintlonglong (telegramm channel)
#include <iostream>
#include <vector>
#include <algorithm>
#include <string>
#include <cmath>
#include <queue>
#include <unordered_set>
#include <map>
#include <set>
#include <random>
using namespace std;

//for coding
typedef long long ll;
typedef long double ld;
#define all(x) x.begin(), x.end()
#define rd(x) for (auto &i : x) cin >> i;
#define rep(i, l, r) for (int i = (l); i < (r); i++)

//for debug
#define ct(x) for (auto i : x) cout << i << ' ';

inline void operator delete (void*) { }

mt19937_64 rnd(239);

const int mod = 998244353;

#define int long long

signed main() {
    ios::sync_with_stdio(0);
    cin.tie(0);
    cout.tie(0);
    cout.precision(12);
    int n;
    cin >> n;
    vector<int> l(n), r(n);
    for (int i = 0; i < n; i++) {
        cin >> l[i] >> r[i];
    }
    vector<int> dp(n + 1, 1);
    for (int i = 1; i <= n; i++) {
        int suml = 0, sumr = 0;
        for (int j = i; j > 0; j--) {
            suml += l[j - 1];
            sumr += r[j - 1];
            if (suml <= 0 && sumr >= 0)
                dp[i] = max(dp[i], dp[j - 1] + 1);
        }
    }
    int ma = 0;
    for (auto i : dp)
        ma = max(ma, i);
    cout << ma;
}
```