

# Олимпиада СПбГУ по информатике 2022/23 учебного года

A	B	C	D	E	F	Sum
100	100	100	100	52	65	517

## Task A ()

```
#include <iostream>
#include <map>
#include <set>
#include <vector>
#include <algorithm>
#include <math.h>
#include <string>
#include <iomanip>
#include <deque>
#include <queue>

#define int long long
#define lod long double
#define ff first
#define ss second
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()
#define endl '\n'

#define fuckyeah cout << "YES" << '\n'
#define bruh cout << "NO" << '\n'

// #pragma GCC optimize("O3, unroll-loops")
// #pragma GCC target("avx2,bmi,bmi2,popcnt,lzcnt")

using namespace std;
typedef pair<int, int> pii;
typedef vector<int> vi;
typedef vector<vi> vvi;
typedef vector<pii> vpii;
typedef vector<vpii> vvpii;
typedef vector<bool> vb;
typedef vector<vb> vvb;

const int INF = 1e9+7;
const int M = 1e9+7;
const int P = 31;
const int N = 30;
const lod PI = 3.1415926535897932384626;

signed main() {
    int n = 6;
    vi a(n, 0);

    for (int i = 0; i < n; ++i) {
        int q;
        cin >> q;
        for (int i = 0; i < n; ++i) {
            if (a[i] >= q) a[i]++;
        }
        a[i] = q;
    }
    for (int elem: a) cout << elem << ' ';
}
```

## Task B ()

```
#include <iostream>
#include <map>
#include <set>
#include <vector>
#include <algorithm>
#include <math.h>
#include <string>
#include <iomanip>
#include <deque>
#include <queue>

#define int long long
#define lod long double
#define ff first
#define ss second
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()
#define endl '\n'

#define fuckyeah cout << "YES" << '\n'
#define bruh cout << "NO" << '\n'

// #pragma GCC optimize("O3, unroll-loops")
// #pragma GCC target("avx2,bmi,bmi2,popcnt,lzcnt")

using namespace std;
typedef pair<int, int> pii;
typedef vector<int> vi;
typedef vector<vi> vvi;
typedef vector<pii> vpii;
typedef vector<vpii> vvpii;
typedef vector<bool> vb;
typedef vector<vb> vvb;

const int INF = 1e9+7;
const int M = 1e9+7;
const int P = 31;
const int N = 30;
const lod PI = 3.1415926535897932384626;

signed main() {
    string cmd;
    cin >> cmd;
    if (cmd[0] == 'f') {
        int n;
        cin >> n;
        int s = 0;
        int q;
        for (int i = 0; i < n; ++i) {
            cin >> q;
            s += q;
        }
        s *= 1e13;
        cout << s;
    }
    else {
        int n;
        cin >> n;
        int q;
        int b;

        cin >> q;
        b = 0;
        b += q % 10;
        q /= 10;
        b += (q % 10) * 10;
        q /= 10;
        b += (q % 10) * 100;
        q /= 10;

        q /= 1e10;
        int s = 0;
```

```

s += q % 10;
q /= 10;
s += (q % 10) * 10;
q /= 10;
s += (q % 10) * 100;
q /= 10;
s += (q % 10) * 1000;
q /= 10;
s += (q % 10) * 10000;
q /= 10;

s += b;

for (int i = 1; i < n; ++i) {
    cin >> q;
    b = 0;
    b += q % 10;
    q /= 10;
    b += (q % 10) * 10;
    q /= 10;
    b += (q % 10) * 100;
    q /= 10;
    s += b;
}
cout << s;
}
}

```

## Task C ()

```
#include <iostream>
#include <map>
#include <set>
#include <vector>
#include <algorithm>
#include <math.h>
#include <string>
#include <iomanip>
#include <deque>
#include <queue>

#define int long long
#define lod long double
#define ff first
#define ss second
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()
#define endl '\n'

#define fuckyeah cout << "YES" << '\n'
#define bruh cout << "NO" << '\n'

// #pragma GCC optimize("O3, unroll-loops")
// #pragma GCC target("avx2,bmi,bmi2,popcnt,lzcnt")

using namespace std;
typedef pair<int, int> pii;
typedef vector<int> vi;
typedef vector<vi> vvi;
typedef vector<pii> vpii;
typedef vector<vpii> vvpii;
typedef vector<bool> vb;
typedef vector<vb> vvb;

const int INF = 1e9+7;
const int M = 1e9+7;
const int P = 31;
const int N = 30;
const lod PI = 3.1415926535897932384626;

signed main() {
    int n = 3;
    vpii a(3);
    for (int i = 0; i < n; ++i) {
        cin >> a[i].ff >> a[i].ss;
        if (a[i].ff > a[i].ss) swap(a[i].ff, a[i].ss);
    }
    set<pii> ans;
    pii b;
    for (int i = 0; i < n; ++i) {
        ans.insert(a[i]);
        for (int j = 0; j < n; ++j) {
            if (i == j) continue;
            for (int _ = 0; _ < 2; ++_) {
                if (a[j].ff > a[j].ss || a[j].ss > a[i].ss) {
                    swap(a[j].ff, a[j].ss);
                    continue;
                }
                if (a[j].ff <= a[i].ff && a[j].ss <= a[i].ss) {
                    if (a[i].ff == a[j].ff && a[i].ss > a[j].ss) {
                        b.ff = a[i].ff;
                        b.ss = a[i].ss - a[j].ss;
                        if (b.ff > b.ss) swap(b.ff, b.ss);
                        if (b.ff > 0) ans.insert(b);
                    }
                }
                if (a[i].ff > a[j].ff && a[i].ss == a[j].ss) {
                    b.ff = a[i].ss;
                    b.ss = a[i].ff - a[j].ff;
                    if (b.ff > b.ss) swap(b.ff, b.ss);
                    if (b.ff > 0) ans.insert(b);
                }
            }
        }
    }
}
```

```

for (int k = 0; k < n; ++k) {
    if (k == i || k == j) continue;
    for (int __ = 0; __ < 2; ++__) {
        if (a[k].ff > a[i].ff || a[k].ss > a[i].ss) {
            swap(a[k].ff, a[k].ss);
            continue;
        }
        if (a[i].ff == a[j].ff + a[k].ff && a[j].ss == a[k].ss && a[j].ss < a[
            i].ss) {
            b.ff = a[i].ff;
            b.ss = a[i].ss - a[j].ss;
            if (b.ff > b.ss) swap(b.ff, b.ss);
            if (b.ff > 0) ans.insert(b);
        }
        if (a[i].ss == a[j].ss + a[k].ss && a[j].ff == a[k].ff && a[j].ff < a[
            i].ff) {
            b.ss = a[i].ss;
            b.ff = a[i].ff - a[j].ff;
            if (b.ff > b.ss) swap(b.ff, b.ss);
            if (b.ff > 0) ans.insert(b);
        }
        if (a[i].ff < a[j].ff + a[k].ff && a[i].ss >= a[j].ss + a[k].ss) {
            b.ff = a[i].ff - a[j].ff;
            b.ss = a[j].ss;
            if (b.ff > b.ss) swap(b.ff, b.ss);
            if (b.ff > 0) ans.insert(b);
            if (a[k].ff == a[i].ff) {
                b.ff = a[i].ff;
                b.ss = a[i].ss - a[j].ss - a[k].ss;
                if (b.ff > b.ss) swap(b.ff, b.ss);
                if (b.ff > 0) ans.insert(b);
            }
        }
        if (a[i].ss < a[j].ss + a[k].ss && a[i].ff >= a[j].ff + a[k].ff) {
            b.ss = a[i].ss - a[j].ss;
            b.ff = a[j].ff;
            if (b.ff > b.ss) swap(b.ff, b.ss);
            if (b.ff > 0) ans.insert(b);
            if (a[k].ss == a[i].ss) {
                b.ss = a[i].ss;
                b.ff = a[i].ff - a[j].ff - a[k].ff;
                if (b.ff > b.ss) swap(b.ff, b.ss);
                if (b.ff > 0) ans.insert(b);
            }
        }
        swap(a[k].ff, a[k].ss);
    }
}
swap(a[j].ff, a[j].ss);
}
}
for (pii elem: ans) {
    cout << elem.ff << ' ' << elem.ss << endl;
}
}

```

## Task D ()

```
#include <iostream>
#include <map>
#include <set>
#include <vector>
#include <algorithm>
#include <math.h>
#include <string>
#include <iomanip>
#include <deque>
#include <queue>

#define int long long
#define lod long double
#define ff first
#define ss second
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()
// #define endl '\n'

#define fuckyeah cout << "YES" << '\n'
#define bruh cout << "NO" << '\n'

// #pragma GCC optimize("O3, unroll-loops")
// #pragma GCC target("avx2,bmi,bmi2,popcnt,lzcnt")

using namespace std;
typedef pair<int, int> pii;
typedef vector<int> vi;
typedef vector<vi> vvi;
typedef vector<pii> vpii;
typedef vector<vpii> vvpii;
typedef vector<bool> vb;
typedef vector<vb> vvb;

const int INF = 1e9+7;
const int M = 1e9+7;
const int P = 31;
const int N = 30;
const lod PI = 3.1415926535897932384626;

signed main() {
    int n;
    cin >> n;
    int a;
    cin >> a;
    cout << "1_" << a << endl;
    cout << "1_" << a << endl;
}
```

## Task E ()

```
#include <iostream>
#include <map>
#include <set>
#include <vector>
#include <algorithm>
#include <math.h>
#include <string>
#include <iomanip>
#include <deque>
#include <queue>

#define int long long
#define lod long double
#define ff first
#define ss second
#define all(x) x.begin(), x.end()
#define rall(x) x.rbegin(), x.rend()
//#define endl '\n'

#define fuckyeah cout << "YES" << '\n'
#define bruh cout << "NO" << '\n'

// #pragma GCC optimize("O3, unroll-loops")
// #pragma GCC target("avx2,bmi,bmi2,popcnt,lzcnt")

using namespace std;
typedef pair<int, int> pii;
typedef vector<int> vi;
typedef vector<vi> vvi;
typedef vector<pii> vpii;
typedef vector<vpii> vvpii;
typedef vector<bool> vb;
typedef vector<vb> vvb;

const int INF = 1e9+7;
const int M = 1e9+7;
const int P = 31;
const int N = 30;
const lod PI = 3.1415926535897932384626;

vector<vvi> dp;

int f(vi const &a) {
    int out = 0;
    int s = 9;

    for (int i = 0; i < a.size(); ++i) {
        for (int j = 0; j < a[i]; ++j) {
            for (int k = 0; k <= s-j; ++k) {
                for (int l = 0; l <= 9; ++l) {
                    out += dp[a.size()-i-1][k][l];
                }
            }
            s -= a[i];
        }
        return out;
    }
}

vi toDig(int n) {
    vi a;
    while (n > 0) {
        a.push_back(n % 10);
        n /= 10;
    }
    vi b;
    while (!a.empty()) {
        b.push_back(a.back());
        a.pop_back();
    }
    return b;
}
```

```

signed main() {
    int n = 10;
    int mxl = 10;
    dp.resize(mxl+1, vvi(10, vi(10)));
    dp[0][0][0] = 1;

    for (int i = 1; i <= mxl; ++i) {
        for (int j = 0; j <= 9; ++j) {
            for (int k = 0; j - k >= 0 && k <= 9; ++k) {
                for (int l = 0; l <= 9; ++l) {
                    dp[i][j][k] += dp[i-1][j-k][l];
                }
            }
        }
    }

    int t;
    cin >> t;

    string cmd;
    cin >> cmd;

    if (cmd[0] == 't') {
        while (t--) {
            int a;
            cin >> a;
            int l = 0, r = 1e10;
            while (r - l > 1) {
                int m = (l + r) / 2;
                vi M = toDig(m);
                if (f(M) > a) r = m;
                else l = m;
            }
            vi q = toDig(l);

            for (int i = 0; i < 10-q.size(); ++i) {
                for (int j = 0; j < 10; ++j) {
                    cout << '0';
                }
                cout << endl;
            }

            int w = 0;
            for (int i = 0; i < q.size(); ++i) {
                w += q[i];
                for (int j = 0; j < n; ++j) {
                    if (j < w) cout << 1;
                    else cout << 0;
                }
                cout << endl;
            }
            cout << endl;
        }
    }
    else {
        while (t--) {
            vi x;
            for (int i = 0; i < n; ++i) {
                int q = 0;
                string s;
                cin >> s;
                for (int j = 0; j < n; ++j) {
                    if (s[j] == '1') q++;
                }
                x.push_back(q);
            }
            sort(all(x));
            vi a;
            a.push_back(x[0]);
            for (int i = 0; i+1 < n; ++i) {
                a.push_back(x[i+1] - x[i]);
            }
            cout << f(a) << endl;
        }
    }
}

```



} } }

## Task F ()

```
a = int(input())  
b = int(input())  
print(a + b)
```