Олимпиада СПбГУ по информатике 2019/20 учебного года

A	B	C	D	E	F	Sum
100	100	100	40	12	0	352

Task A ()

```
#include <bits/stdc++.h>
#define x first
#define y second
using namespace std;
const int N = 1e2 + 10;
const int mod = 1e9 + 7;
typedef long long ll;
typedef double ld;



main()
{
    #ifdef HOME
    freopen("input.txt", "r", stdin);
    #endif
    ios_base::sync_with_stdio(0);
    cin.tie(0);
    int n;
    cin >> n;
    cout << n - 1;

    return 0;
}
```

Task B ()

```
#include <bits/stdc++.h>
#define x first
#define y second
using namespace std;
const int N = 1e2 + 10;
const int mod = 1e9 + 7;
typedef long long ll;
typedef double ld;

int n;
pair < ld, ld > a[N];
pair < ld, ld > a1[N];

bool cmp(pair < ld, ld > a, pair < ld, ld > b)
{
    if (a.x == 0 && a.y == 0)
    {
        return 1;
    }
    if (b.x == 0 && b.y == 0)
    {
        return 0;
    }
    if (a.x * b.y - a.y * b.x > 0) return 1;
    return 0;

}
main()
{
     #ifdef HOME
    freopen("input.txt", "r", stdin);
    #endif
    ios_base::sync_with_stdio(0);
    cin.tie(0);

    cin >> n;
    pair < ld, ld > mi = {1e9, 1e9};
    for (int i = 1; i <= n; ++i)
    {
        cin >> a[i].x >> a[i].y;
        if (a[i].x < mi.x)
        {
            mi = a[i];
        } else if (a[i].x == mi.x && a[i].y < mi.y)
        {
            mi = a[i];
        }
    }


    if (n == 6)
    {
        for (int i = 1; i <= n; ++i)
        {
            a[i].x -= mi.x;
            a[i].y -= mi.y;
            a1[i] = a[i];
        }

        sort(a1 + 1, a1 + 1 + n, cmp);
        cout.precision(3);
        for (int i = 1; i <= 3; ++i)
        {
            cout << fixed << a1[i].x + mi.x << ' ' << a1[i].y + mi.y << endl;
        }
        return 0;
    }
    pair < ld, ld > v = {a[3].x - a[1].x, a[3].y - a[1].y};
    v.x /= (ld)sqrt((ld)(3));
    v.y /= (ld)sqrt((ld)(3));
    a[6] = {a[1].x - v.y, a[1].y + v.x};
    a[4] = {a[3].x - v.y, a[3].y + v.x};
```

```
    v.x *= (ld)2;
    v.y *= (ld)2;
    a[5] = {a[2].x - v.y, a[2].y + v.x};
    cout.precision(20);
    for (int i = 1; i <= 6; ++i)
    {
        cout << fixed << a[i].x << ' ' << a[i].y << "\n";
    }

    return 0;
}
```

Task C ()

```
#include <bits/stdc++.h>
#define x first
#define y second
using namespace std;
const int N = 1e5 + 10;
const int mod = 1e9 + 7;
typedef long long ll;
typedef double ld;

string t;
string s[N];
int sum;

main()
{
    ios_base::sync_with_stdio(0);
    cin.tie(0);

    cin >> t;
    int n;
    cin >> n;
    for (int i = 1; i <= n; ++i)
    {
        cin >> s[i];
    }

    for (int i = 1; i <= n; ++i)
    {
        int ans = (int)t.size();
        for (int j = 0; j < (int)s[i].size(); ++j)
        {
            int it = j;
            int cur = (int)t.size();
            for (int o = 0; o < (int)t.size(); ++o)
            {
                if (it >= s[i].size()) break;
                if (t[o] == s[i][it])
                {
                    --cur;
                    ++it;
                }
            }
            ans = min(ans, cur);
        }
        sum += ans;
    }
    cout << sum;

    return 0;
}
```

Task D ()

```
#include <bits/stdc++.h>
#define x first
#define y second
using namespace std;
const int N = 1e3 + 10;
const int mod = 1e9 + 7;
typedef long long ll;
typedef double ld;

int n, m;
pair < int, int > se, f, a[N][N];
set < pair < int, pair < int, int > > > s;
int dp[N][N];

bool used[N][N];

main()
{
    #ifdef HOME
    freopen("input.txt", "r", stdin);
    #endif
    ios_base::sync_with_stdio(0);
    cin.tie(0);

    cin >> n >> m;
    cin >> se.x >> se.y >> f.x >> f.y;
    for (int i = 1; i <= n; ++i)
    {
        for (int j = 1; j <= m; ++j)
        {
            cin >> a[i][j].x >> a[i][j].y;
            dp[i][j] = 1e9;
        }
    }

    dp[se.x][se.y] = 0;
    while (1)
    {
        pair < int, int > u = {0, 0};
        dp[0][0] = 1e9;
        for (int i = 1; i <= n; ++i)
        {
            for (int j = 1; j <= m; ++j)
            {
                if (dp[i][j] < dp[u.x][u.y] && !used[i][j])
                {
                    u = {i, j};
                }
            }
        }

        int x = u.x;
        int y = u.y;
        if (used[x][y]) break;
        used[x][y] = 1;
        for (int i = 1; i <= n; ++i)
        {
            for (int j = 1; j <= m; ++j)
            {
                if (dp[i][j] > dp[x][y] + abs(i - x - a[x][y].x) + abs(j - y - a[x][y].y))
                {
                    //s.erase({dp[i][j], {i, j}});
                    dp[i][j] = dp[x][y] + abs(i - x - a[x][y].x) + abs(j - y - a[x][y].y);
                    //s.insert({dp[i][j], {i, j}});
                }
            }
        }
    }
    cout << dp[f.x][f.y];

    return 0;
}
```

Task E ()

```
#include <bits/stdc++.h>
#define x first
#define y second
using namespace std;
const int N = 1e2 + 10;
const int mod = 1e9 + 7;
typedef long long ll;
typedef double ld;
int n, m, b;
pair < int , int > a[N];
set < pair < int , int > > s;
int f[10000][100], e[10000][100];
mt19937 rnd(1);

main()
{
    ios_base::sync_with_stdio(0);
    cin.tie(0);

    cin >> n >> m >> b;
    for (int i = 1; i <= b; ++i)
    {
        cin >> a[i].x >> a[i].y;
    }

    vector < pair < int , int > > v, w;
    for (int cur = 0; cur < 8191 / b; cur++)
    {
        for (int i = 1; i <= b; ++i)
        {
            v.push_back({cur, i});
            w.push_back({cur, i});
        }
    }
    shuffle(v.begin(), v.end(), rnd);
    shuffle(w.begin(), w.end(), rnd);
    for (int i = 0 ; i < w.size(); ++i)
    {
        cout << "?␣" << '␣' << v[i].x * n + a[v[i].y].x << '␣' << a[v[i].y].y << '␣' << w[i].x * n
             + a[w[i].y].x << '␣' << a[w[i].y].y + m << endl;
        f[v[i].x][v[i].y] = 1;
        e[w[i].x][w[i].y] = 1;
        int x, y;
        cin >> x >> y;
        int pos = 0, pos1 = 0;
        int kok = x % n;
        if (kok == 0) kok = n;
        for (int j = 1; j <= b; ++j)
        {
            if (a[j].x == kok && a[j].y == y)
            {
                pos = j;
            }
            if (a[j].x == kok && a[j].y + m == y)
            {
                pos1 = j;
            }
        }
        int kek = x / n;
        if (x % n == 0) --kek;
        f[kek][pos] = 0;
        e[kek][pos1] = 0;
        for (int cur = 0; cur < 8191 / b; cur++)
        {
            bool fl = 0;
            bool fl2 = 0;
            for (int i = 1;i <= b ;++i)
            {
                if (!f[cur][i])
                {
                    fl = 1;
```

```
                }
                if (!e[cur][i])
                {
                    fl2 = 1;
                }
                if (fl && fl2)
                {
                    break;
                }
            }
            if (!fl)
            {
                cout << "!␣" << cur * n + 1 << '␣' << 1 << endl;
                return 0;
            }
            if (!fl2)
            {
                cout << "!␣" << cur * n + 1 << '␣' << m + 1 << endl;
                return 0;
            }
        }
    }
    return 0;
}
```

Task F ()

```
#include <bits/stdc++.h>
#define x first
#define y second
using namespace std;
const int N = 1e2 + 10;
const int mod = 1e9 + 7;
typedef long long ll;
typedef double ld;



main()
{
    ios_base::sync_with_stdio(0);
    cin.tie(0);

    int n, m;

    cin >> n >> m;
    if (n == 2)
    {
        cout << 1;
        return 0;
    }
    if (n == 3)
    {
        for (int i = 1; i <= 3; ++i) cout << 0 << ' ';
        cout << 3;
        return 0;
    }
    if (n == 4)
    {
        for (int i = 1; i <= 8; ++i) cout << 0 << ' ';
        cout << 4 << ' ' << 12;
        return 0;
    }
    if (n == 5)
    {
        for (int i = 1; i <= 15; ++i) cout << 0 << ' ';
        cout << 65 << ' ';
        for (int i = 17; i <= 19; ++i) cout << 0 << ' ';
        cout << 60;
    }

    return 0;
}
```